Exercise 14G

1 Solve these equations, giving your answers in exact form.

a $e^x = 6$ **b** $e^{2x} = 11$ **c** $e^{-x+3} = 20$

d $3e^{4x} = 1$ **e** $e^{2x+6} = 3$ **f** $e^{5-x} = 19$

2 Solve these equations, giving your answers in exact form.

a $\ln x = 2$ **b** $\ln(4x) = 1$ **c** $\ln(2x + 3) = 4$

d $2\ln(6x - 2) = 5$ **e** $\ln(18 - x) = \frac{1}{2}$ **f** $\ln(x^2 - 7x + 11) = 0$

3 Solve these equations, giving your answers in exact form.

a $e^{2x} - 8e^x + 12 = 0$ **b** $e^{4x} - 3e^{2x} = -2$

c $(\ln x)^2 + 2\ln x - 15 = 0$ **d** $e^x - 5 + 4e^{-x} = 0$

e $3e^{2x} + 5 = 16e^x$ **f** $(\ln x)^2 = 4(\ln x + 3)$

Hint All of the equations in question 3 are quadratic equations in a function of x.

Hint First in part **d** multiply each term by e^x.

E/P **4** Find the exact solutions to the equation $e^x + 12e^{-x} = 7$. **(4 marks)**

5 Solve these equations, giving your answers in exact form.

a $\ln(8x - 3) = 2$ **b** $e^{5(x-8)} = 3$ **c** $e^{10x} - 8e^{5x} + 7 = 0$

d $(\ln x - 1)^2 = 4$

E/P **6** Solve $3^x e^{4x-1} = 5$, giving your answer in the form $\frac{a + \ln b}{c + \ln d}$ **(5 marks)**

Hint Take natural logarithms of both sides and then apply the laws of logarithms.